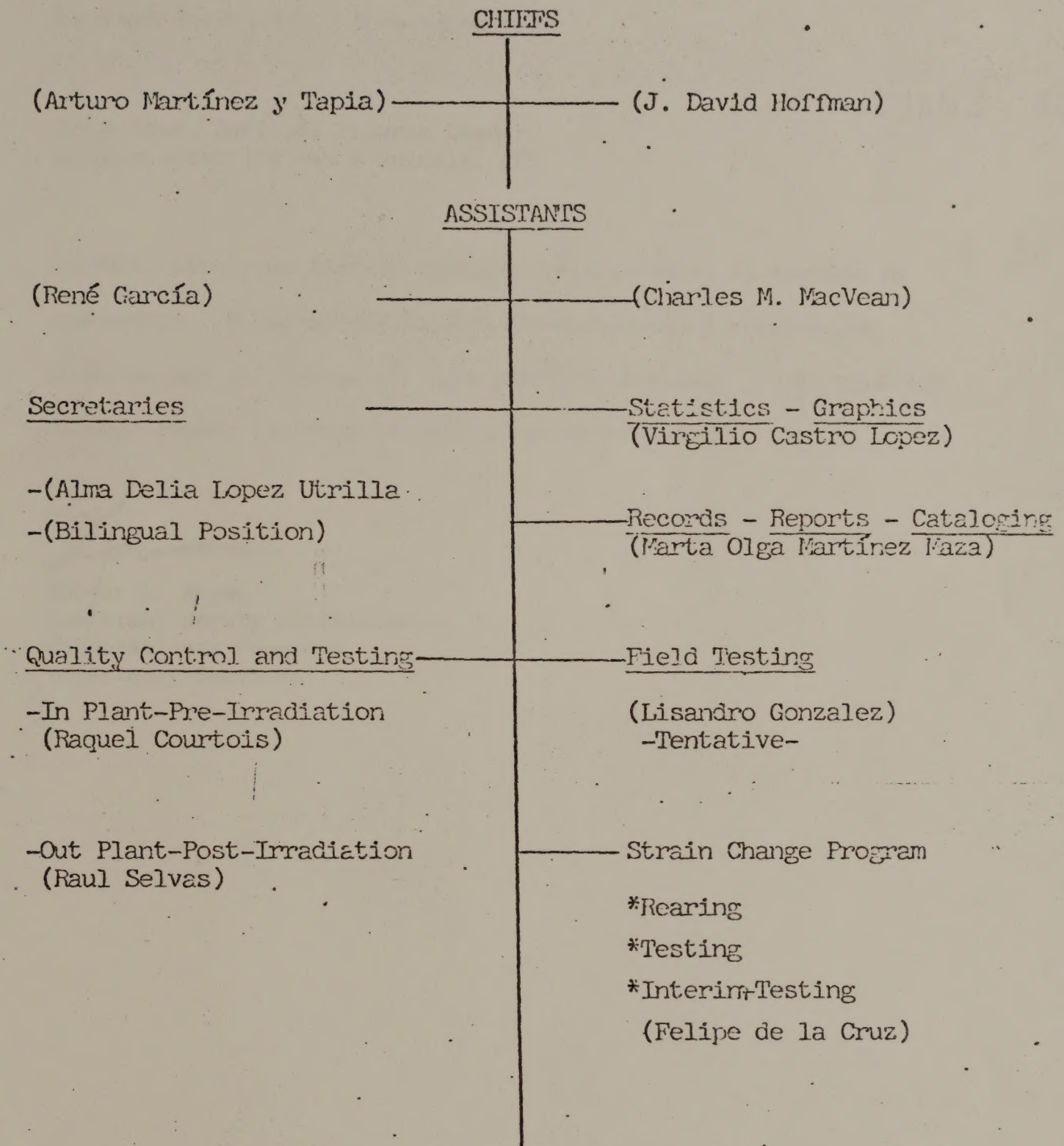


ORGANIZATIONAL CHART FOR INVESTIGATION AND EXPERIMENTAL DEVELOPMENT

(January 3, 1983)





United States
Department of
Agriculture

Animal and
Plant Health
Inspection Service

RECEIVED JAN 14 1982

Wash, D.C. 20250

Subject: Reserach Priorities - Screwworms

Date: JAN 3 1982

To: Ralph Bram, National Program Leader
Insects Affecting Man & Animals, ARS

I concur with your list of research priorities as it applies to screwworms. Research dedication to resolution of eradication problems has brought us this far and I'm confident you'll find the answers needed to carry us through to eradication.

Norvan L. Meyer
Assistant Deputy Administrator
International Programs
Veterinary Services

cc:
Laster
King
1-10683

1/10
rk

1/10
1/10/82

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
SOUTHWEST REGION

January 10, 1983

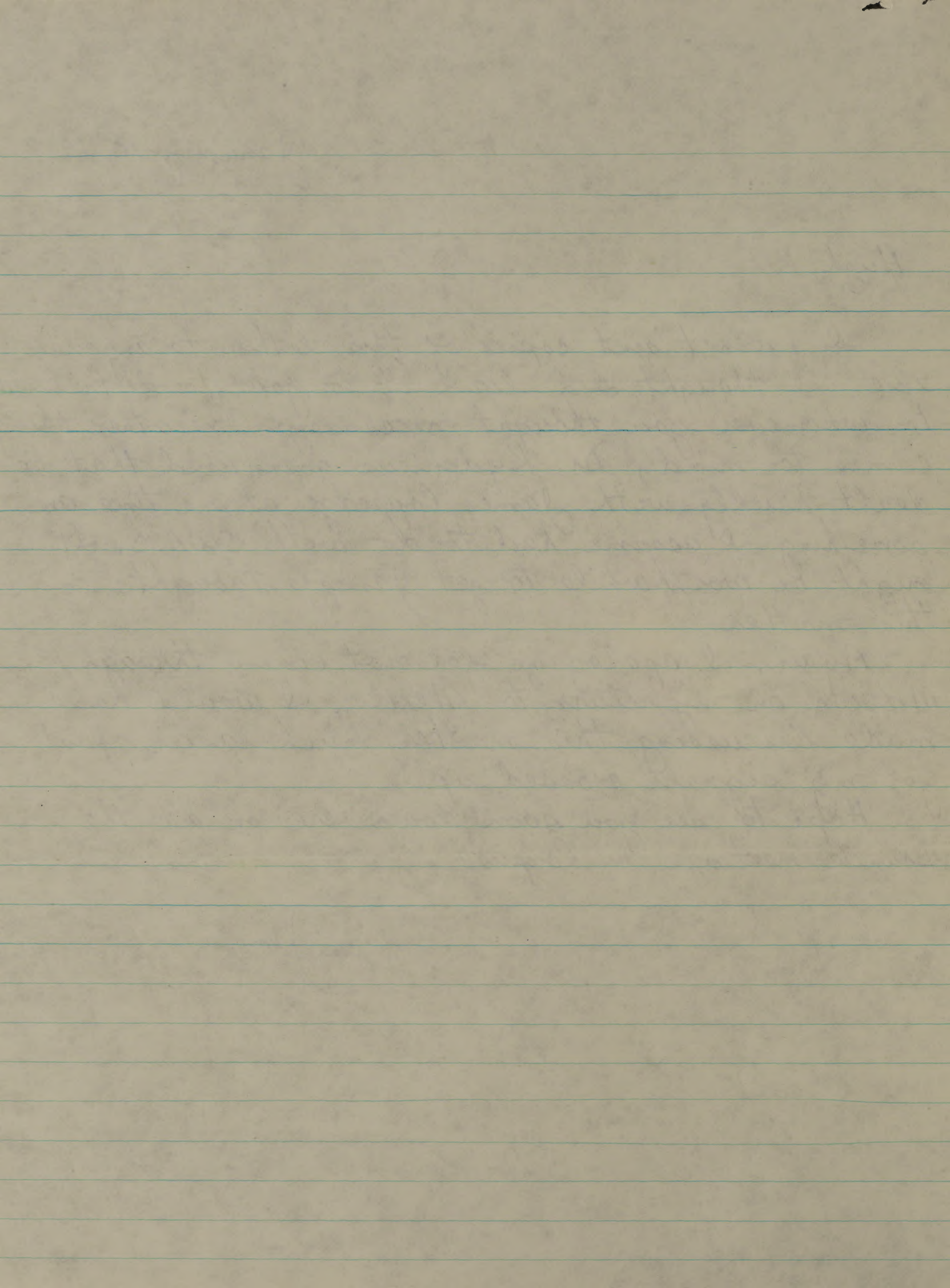
Hugh,

I haven't sent copies of this letter to anyone else. I thought I'd leave it to you to distribute to whomever you thought necessary. One other thing comes to mind, Dr. Kydonieus mentioned that he dealt briefly with James Coppedge at one time on something I assume had to do with SWASS. It might be worthwhile to get James's thoughts on this matter.

Again, I apologize for not coming through Mission on my return to Mexico. I would have made discussing this matter much easier. Just got my signals crossed up.

Hope to see you soon down here or at the Branch meetings in Corpus.

Jim



UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
SOUTHERN REGION

RECEIVED JAN 17 1983

January 9, 1983.

Dr. Hugh Graham
USDA/ARS
P.O. Box 986
Mission, TX 78572

Dear Hugh,

I'll try to fill you in on what information I was able to gather in the States about the Hercon slow release system, and on the questions and ideas that surfaced from my discussions with Mort Beroza and the people at Health-Chem Corporation. Mort Beroza picked me up at my mother's home on the morning of December 27 and we drove up to the Health-Chem plant in York, Pennsylvania. We were met there by Dr. Agis Kydonieus, an executive vice president at Health-Chem, who had driven down from New York City that morning, and by the plant manager. We spent the day discussing their product and how it could be adapted to suppressing screwworm, and I took about a half hour tour of the plant.

Basically, they have developed a slow release material and a system for dispersing it, and it is currently being used with a pheromone as a mating disruption system for pink bollworm (see enclosed xerox). A "unit" or "flake" (equivalent to our "pellet") consists of a reservoir layer with the pheromone which is enveloped by a protective plastic barrier. Very small flakes (square, ca. 3 mm on a side) are broadcast over the desired crop. The pheromone diffuses at controlled rates dependent upon the physical characteristics (e.g., number and size of pores) of the reservoir layer.

.....

We discussed the possible advantages this system had over our SWASS-pellet system, and the ways that the system could be adapted to our screw-worm suppression program. Some immediate advantages I saw were the following: (1) it would be possible to broadcast more units per area and thus possibly increase the chance of adults intercepting the units (the idea that Berger of Auburn proposed when he was in Tuxtla), (2) life of the unit could be prolonged because of the controlled release of the attractant, (3) the units are "sticky" (the substance "Phero-tac" is formulated with the flakes) and adhere to vegetation --- this I believe would be particularly advantageous in areas of high rainfall and dense vegetation (e.g., Chiapas, Tabasco, Veracruz, etc.) where our pellets get "lost" under dense vegetation or drown in puddles, and (4) the Hercon application system is quite refined so that precise application rates can be obtained - - I have little knowledge of SWASS application (discussed below) but I'm guessing that Hercon is superior. Some of the immediate questions/problems that came to mind that would form a basis for preliminary research were: (1) How small a unit can we have without losing attractancy or killing power. We would need to test a range of sizes of the Hercon flake against the SWASS pellet. I'm sure we would require something larger than the 3 mm square flake used on the pink bollworm because we have a more complex assortment of ingredients that must go into the unit. Preliminary tests could be conducted at the Tuxtla plant with bait buckets. (2) Are the ingredients (blood, sugar, insecticide, swormlure) compatible with the Hercon flakes and application system, i.e., can they be formulated with the flake? It may be necessary to look for substitutes for some of these ingredients (e.g., a protein source other than blood). (3) What are the cost-benefit ratios of the "pellet" system vs. the "flake" system?

After, or even before, items such as # 1 and # 2 above are worked out, we'll have to determine if the Hercon application system has the capacity to disperse over the large areas required by the Screwworm Program. This came up in our discussions and unfortunately I knew too little about SWASS dispersal to answer some of these questions. I think Mort and Agis, and myself as well, would like to know: (1) How are SWASS pellets dispersed from planes ? Are they shoveled out the back doors ? How are the rates of release

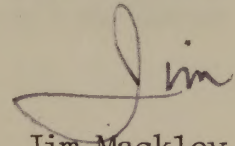
controlled? (2) What is the normal rate (s) of dispersal (lbs or numbers of pellets per square mile, swath widths, etc)? (3) What is the capacity of a SWASS dispersing plane, i.e., what is the maximum area it can cover with SWASS pellets in one flight. (4) How much SWASS is produced and dispersed in a year; how much area is covered per year? (5) Is the capacity of the current system sufficient to meet the needs of the Program? It is answers to questions such as these that we need to know in order to have some idea if the Hercon application system can work for us. I don't know, but we may possibly be able to forego their application system but still use the flake and disperse it as we do pellets.

Other information they were interested in, but which I wasn't able to provide, was the history of the insecticides that have been researched and have been or are now being used in SWASS. I'm sure this information is in quarterly reports or perhaps Harold Brown has it on file. This information, *Answers to* the questions discussed in the previous paragraph, and any publications we have on SWASS I think would be helpful to them. I'll be sending them HEB'S and my manuscript on swormlure-2 research and a copy of the swormlure-4 paper I'll present at Corpus Christi. Mort Beroza would be the ideal person to discuss and funnel this information through, in fact I suggested (if it's not already a fait accompli) that we in ARS use Mort as the contact/go-between.

After answering what questions we can at this point, and if it seems desirable to pursue this line, I think we should write up a proposal that would consider the preliminary questions that will require some time and research. This of course will involve questions of money and delegation of responsibility. One additional item: Agis mentioned that if you or anyone were interested in seeing a demonstration of the application system in the field, you could contact a John Knapp, Director of Marketing, at 209-439-8962. This is some place in California where they are presently applying the Hercon Disrupt Gossyplure flake.

That's about all, Hugh. I hope I've covered everything. I put this together alittle hastily, so let me know if your have any questions.

S i n c e r e l y ,

A handwritten signature in dark ink, appearing to read "Jim", with a stylized flourish extending from the end of the word.

Jim Mackley
Research Entomologist.

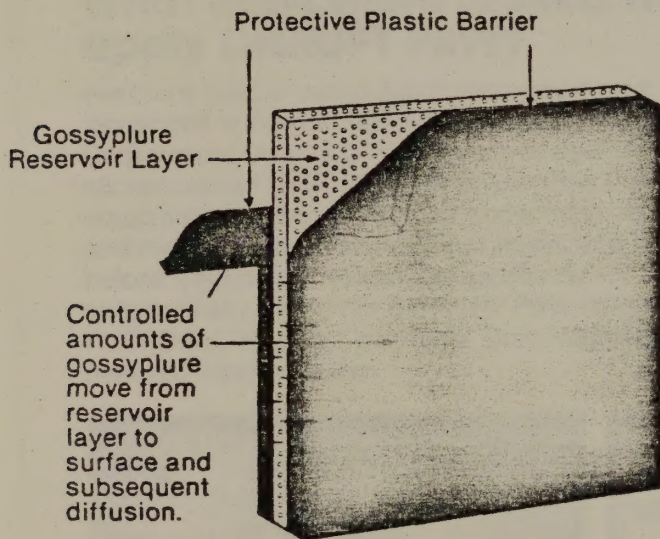
cc. File

Q&A

What is HERCON® DISRUPT® PBW?

DISRUPT Pink Bollworm (PBW) flakes are small, aerially applied, multi-layered plastic "sandwiches" that emit gossypure, the sex pheromone of the pink bollworm, *Pectinophora gossypiella*, at a controlled rate, over an extended period of time.

The Hercon® Disrupt® Gossypure Flake



How does DISRUPT PBW work?

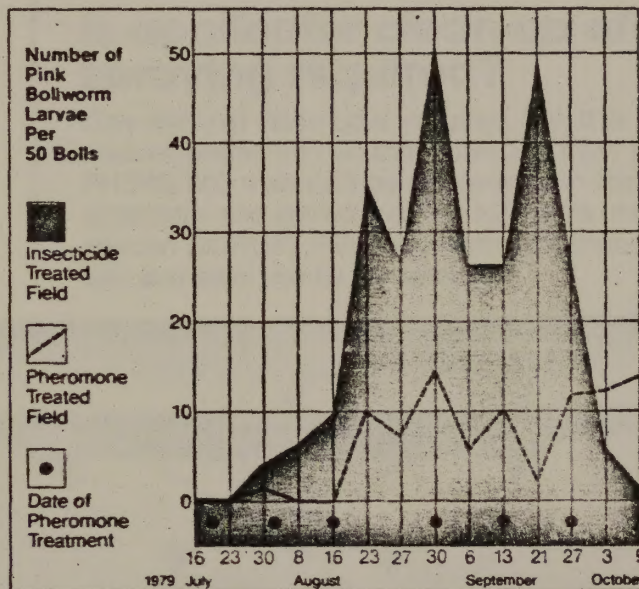
DISRUPT PBW flakes are broadcast in the field from special applicators mounted on agricultural aircraft. The flakes release the pheromone into the "mating zone" of the crop (upper canopy) where adult pink bollworm moths are searching for sexually receptive females with which to mate. Permeating the "mating zone" with the synthetic sex pheromone results in males chasing "artificial" females but rarely locating a real female ready to mate.



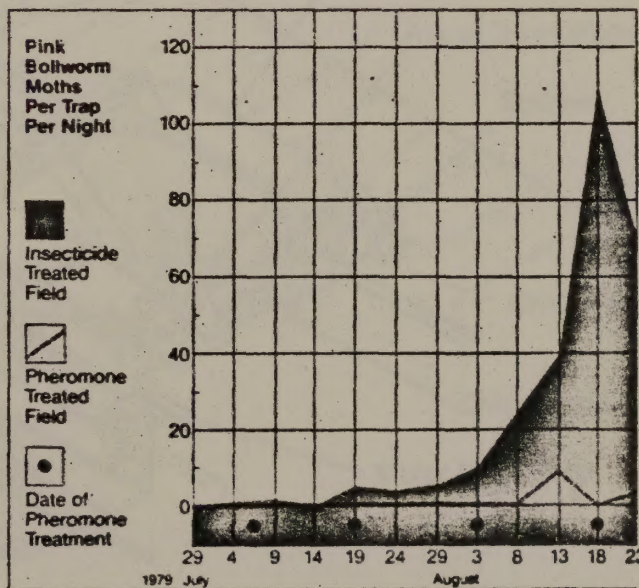
How does DISRUPT PBW help protect the cotton crop from damage?

Preventing most of the female pink bollworm moths in a given field from mating greatly reduces the number of damaging larval offspring produced by that generation. Thus, the development, from generation to generation, of economically damaging infestations of pink bollworm is delayed or prevented. Furthermore, since gossypure's effect is specific on the pink bollworm, beneficial insects in the field will not be harmed.

Pink bollworm damage



The effect of gossypure on pink bollworm moth infestations



What is the application rate of DISRUPT PBW?

DISRUPT PBW is applied at an average rate of 60 grams of flakes per acre. The EPA registered label allows an application of 1.5 to 2.0 grams actual gossypure per acre. DISRUPT PBW flakes are conveniently packaged in 1.3-lb and 2.6-lb bags sufficient to treat 10 acres and 20 acres, respectively. When DISRUPT PBW is applied at recommended rates, there will be 10,000 to 13,000 flakes, or pheromone point sources, applied per acre. The flakes can be readily observed on the upper canopy of the crop.

What equipment is used to apply DISRUPT PBW?

Hercon's special aerial application equipment, developed in conjunction with Schweizer Aircraft Corporation, makers of the Ag Cat, is used to apply sticker-coated DISRUPT PBW flakes. This unique equipment eliminates the time consuming, expensive and messy manual pre-mixing of flakes and sticker before treatment. The Hercon applicator automatically mixes the DISRUPT PBW flakes and PHERO-TAC™ sticker internally. Both materials are metered independently.

What is PHERO-TAC?

PHERO-TAC is an inert adhesive specially formulated for use with DISRUPT PBW flakes. PHERO-TAC allows the flakes to cling to foliage in the insect mating zone providing visual confirmation of uniform flake coverage.

What controls the application rate of the DISRUPT flakes?

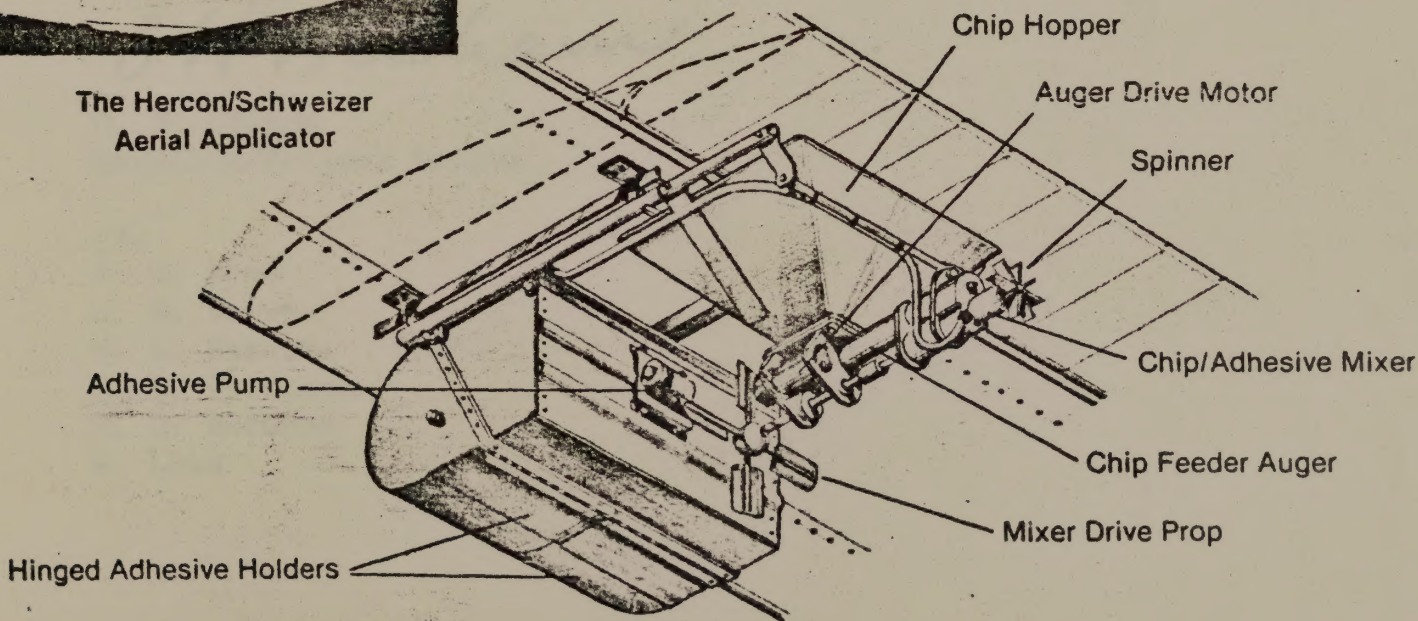
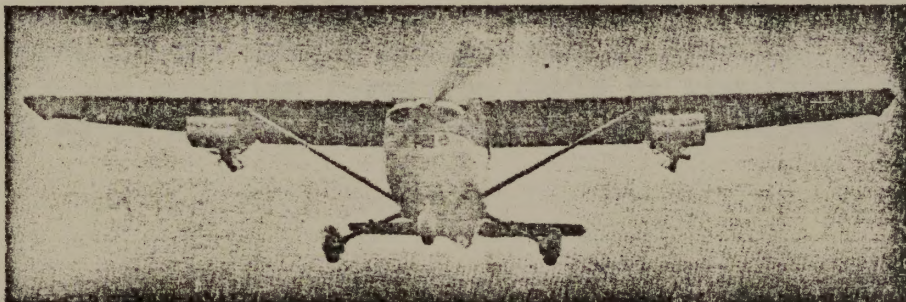
Precision electronic controls are used. These controls are pre-set to accommodate aircraft type and desired speed. Once set, only a periodic check is required. At normal distribution rate, 250 to 300 acres can be treated per mission. Ground or "down" time is approximately 7 to 10 minutes. A recommended 50 foot swath will provide even DISRUPT PBW flake distribution over large areas quickly and economically.

Is applicator clean-up after spraying required?

Only minimal clean-up is required, but, it is recommended that unused DISRUPT PBW and PHERO-TAC materials be removed from the applicator and stored properly for future use. The Hercon DISRUPT PBW applicator was designed for fast and easy use by ag-operators:



The Hercon/Schweizer
Aerial Applicator





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Research
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Southern Region
Oklahoma-Texas Area

Screwworm Research
P. O. Box 986
Mission, TX 78572

January 5, 1983

Dr. L. Levenbook
Laboratory of Physical Biology
National Institutes of Health
Bethesda, MD 20205

Dear Dr. Levenbook:

I have read with great interest your paper with Dr. Shaaya on the feeding and pupariation of C. vicina larvae (J. Insect Physiol. 28: 683-688) and have speculated on the possible application of your findings to our research on the mass rearing of screwworm larvae. USDA, in cooperation with Mexican government agencies, operates a rearing plant at Tuxtla Gutierrez, Chiapas which routinely produces 300 to 500 million screwworm pupae per week. When newly colonized strains are first placed into mass production we often see a great deal of variation in the time that larvae spend in the rearing medium and the size of the crawl-off larvae. Many larvae leave the medium too soon and produce small flies of reduced vigor. Others do not crawl off of the rearing vats at the end of the normal rearing cycle (about 6 days) and are lost in the discarded medium.

Obviously program efficiency would benefit tremendously if larval nutrition and physiology could be deliberately manipulated so that all larvae attain a size of 60-75 mg at close to the same time (plus or minus 24 hr). Do you see any possibility that one or more of the subtle nutritional or hormonal factors which influence larval growth and puparium formation could be regulated so as to approach this ideal? We would greatly appreciate any comments you might care to make.

Sincerely,

O. H. GRAHAM
Location/Project Leader

cc:

R. A. Bram
H. E. Brown
R. L. Harris
R. D. Peterson
H. C. Hofmann
R. Lowe



United States
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Agriculture

Agricultural
Research
Service

Southern Region
Oklahoma-Texas Area

Screwworm Research
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

January 3, 1983

Dr. Chris Hofmann
USDA, APHIS, Veterinary Services
Screwworm Eradication Program
Leibnitz #20 llo. Piso
11590 - Mexico D.F.

Dear Chris,

I hope the New Year finds you and your family healthy. Perhaps this will be a banner year for the Program!

I have enclosed a copy of a letter sent to Bill Hart in Weslaco that briefly outlines the rationale behind my request to initiate remote sensing studies near Pinotepa Nacional; I should be hearing from Bill next week.

Briefly, I will need stereo, vertical photos of the Pacific Coastal Plain at Pinotepa Nacional. The exact altitude and flight lines are contingent on the type of equipment available. Images must be in color infra-red with an approximate final photo scale of 1:10,000. Overlap must be 60% (along flight line) in order to produce stereo imagery. Once photos are in hand, release points and traps can be located strategically. Concurrently, plant communities can be sampled and classified. A survey of flowering vegetation will also provide samples for carbohydrate analysis. Within the next two weeks I would like to visit the area for some preliminary reconnaissance.

We are also in desperate need of 1:50,000 scale topographic maps. I have seen only 1 type, a military issue. I know that the Moscamed Program uses these; Joe Nichols is trying to find out how to buy them. Would you also check your contacts in Mexico City to see how the Commission can purchase these? We would like to obtain a complete series of Chiapas, and complete coverage of the Isthmus; we will also need complete coverage of the Pinotepa Nacional area.

If you need more detailed information right away, let me know and I'll see what I can prepare.

Sincerely,

R. J. BRENNER
Research Entomologist

Enc.

cc: O.H. Graham ✓



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Southern Region
Oklahoma-Texas Area

Screwworm Research
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

December 22, 1982

William G. Hart
USDA, ARS, SR, OTA
Fruit Protection and Production Research
509 West Fourth Street
Weslaco, TX 78596

Dear Bill,

Per our telephone conversation of 17 December, I am writing this letter to describe my research interests here in Mexico and to request your assistance in remote sensing an area near Pinotepa Nacional, near Acapulco.

Data on the field bionomics of screwworms in Mexico is virtually non-existent. It is fairly certain that adult screwworms have the capability of extensive flight, and that carbohydrates serve as the primary fuel for flight. Additionally, there are several indications that mating may take place near flowers, probable sources of carbohydrates. Hence, in order to gain a better understanding of the behavior of screwworms (i.e. - dispersal and mating) I need to develop techniques whereby I can identify the source of carbohydrates found in the crop of screwworms captured in the field. Thus far, laboratory experiments designed to assess the stability of carbohydrates in the crop have been completed - data are pending. If the proportions of various carbohydrates found in the crop remain stable, or predictable, and if the proportions of carbohydrates in carbohydrate sources (e.g. - flowers, fruit) are diagnostic at the generic level, then we may be able to analyze crop contents of flies and determine which plants or fruits are serving as carbohydrate sources.

It is at this point where remote sensing is desirable. Using color infra-red aerial photography in stereo, we can classify plant communities and determine "carbohydrate availability ratios" (CAR). For example, 4 flowering plants may be present in ratios of 1:3:21:37; carbohydrate analyses of crop contents may indicate that flies imbibe carbohydrates from these plants in the ratio of 4:2:1:5, respectively. These ratios can be converted to proportions and divided, respectively, to yield "foraging ratios":

	Plant Types			
	I	II	III	IV
Imbibition ratios	0.33	0.17	0.08	0.42
"CAR"	0.02	0.05	0.34	0.60
Foraging ratios	16.50	3.40	0.24	0.70

Hence, these data would indicate that flies show an aversion to types III and IV, prefer type II and show a strong preference for type I. Further studies would

be undertaken to determine if these sites may also serve as congregation sites during mating. Stereo imagery can be used to determine if flight patterns of screwworms are a function of plant communities or topography.

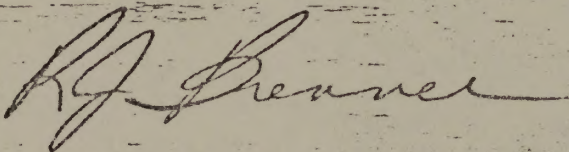
Beginning in late February, I will be conducting a field evaluation of 2 factory strains of screwworms near Pinotepa Nacional on the Pacific coastal plain. Consequently, I will have an opportunity to release and recapture large numbers of screwworms (unfed at emergence). This will be an ideal opportunity to develop this technology of carbohydrate identification.

In order to fully take advantage of this opportunity, I need to obtain color infra-red stereo imagery (60% overlap; 9"x9" final size photos) of this region by early February. I had a little experience with remote sensing in 1973-74 at the University of Illinois. I have used a Hasselblad with an 80mm lense (frame size 2.18" square edge). In fact, I have a computer printout giving scale, ground coverage, overlap coverage, image motion at the film plane, and intervals (in seconds) for stereo at 5 cruising speeds at altitudes ranging from 100 - 15,000 ft. in 100 ft. intervals. These printouts were generated for 1/500 second and 1/250 second shutter speeds. At the least, would it be possible to borrow a similar camera, lense, and intervalometer for this study?

Ideally, I would like your full participation in this project. I would like your laboratory to take these photos and to analyze plant communities (hectares per plant type per photo, proportions of plant types per hectare per photo, or other suitable indices). I will then provide the ground truth, either alone or in cooperation with your laboratory.

I have initiated efforts to obtain permits to take aerial photos of the proposed test site. At this time I would like your comments on this proposal and your recommendations as to which equipment would be best suited to meet objectives, and your thoughts as to your degree of participation in this project.

Sincerely,



R. J. BRENNER
Research Entomologist

cc: O.H. Graham



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Oklahoma-Texas Area

Screwworm Research
P. O. Box 986
Mission, TX 78572

January 20, 1983

Dr. José A. Ferrer R.
Especialista en Salud Animal
Instituto Interamericano de
Cooperacion para la Agricultura
Apartado Postal 55
2200 Coronado
San José, Costa Rica

Dear José:

Thank you for your kind letter of January 3; we very much appreciate your willingness to help our people with the proposed collections of Costa Rican screwworms. I am very pleased to read that Dr. Freddy Ramirez has offered to work with our scientists.

Dr. Robert L. Mangan and Mr. José Garcia have confirmed their airplane reservations and expect to arrive in San Jose at 5:55 pm on January 24 on the LACSA flight from New Orleans. Any help you can give them will be very much appreciated.

Sincerely,

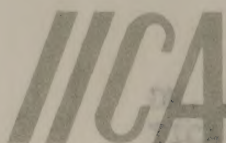
*Best personal
regards,*

Hugh

O. H. GRAHAM
Location/Project Leader

cc:

R. L. Mangan
C. J. Whitten



INSTITUTO INTERAMERICANO DE COOPERACION PARA LA AGRICULTURA
INTER-AMERICAN INSTITUTE FOR COOPERATION ON AGRICULTURE
INSTITUT INTERAMERICAIN DE COOPERATION POUR L'AGRICULTURE
INSTITUTO INTERAMERICANO DE COOPERAÇÃO PARA A AGRICULTURA

Dr. JOSÉ A. FERRER R.
IICA 2200 Coronado
San José, Costa Rica

RECEIVED JAN 17 1983

Robert Graham and Jose Garcia will arrive at San Jose at 5:55 PM
January 24 via LACSA from New Orleans, LA. Please reserve one room
Hotel Amstel. Will greatly appreciate any help you can give them.

DP/SA-004

3 de enero de 1983

GRAHAM
Screwworm Research
Mission, Texas

DIRECCION GENERAL

Sede Central
Apartado Postal 55
2200 Coronado
San José, Costa Rica
Cable: IICASANJOSE
Telex: 2144 IICA

NOT SENT
TO JOSE F.
BY TELEPHONE
01/20/83

Señor
Dr. O. H. Graham
Screwworm Research
P. O. Box 986
Mission, Texas 78572
U. S. A.

Estimado Dr. Graham:

En contestación a su atenta carta de fecha 29 de noviembre pasado, me place comunicarle que he hecho los arreglos pertinentes con el Doctor Freddy Ramírez para que preste toda su cooperación al científico de su laboratorio, que viaja a Costa Rica a fines de enero, en la investigación que éste realice en relación al Gusano Barenador.

Sin más a que hacer referencia, y esperando verlo por acá en un futuro muy próximo, se despide de usted,

Muy atentamente,

Dr. José A. Ferrer R.
Especialista en Salud Animal



January 18, 1983

SUBJECT: Reproductive Isolation in Screwworm Populations

TO: Ralph A. Bram
National Program Leader
Insects Affecting Man & Animals

This is in response to your memorandum of December 16 on this subject. I had read the December 10 issue of Science before receiving your communication. I was frankly disturbed that the ARS Letter was provided to the authors of the publication and that their rebuttal was published simultaneously with the ARS Letter to the Editor.

I agree with the second paragraph of your memorandum, we should not respond in any manner or form to the Richardson hypothesis. We have now satisfied Dr. Harry Mussman's concerns that we protect our flanks--a move which I felt necessary only to satisfy him. The only comment of ARS scientists or managers to any additional information or misinformation from our colleagues at UT should be "no comment". Let's get on with some science.

T. B. Kinney, Jr. /cc

T. B. KINNEY, Jr.
Administrator

cc:

R. F. Barnes w/enclosure
M. E. Carter "
J. R. Johnston "
E. L. Kendrick "

*1/20
pk 1/21/83*



United States
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Oklahoma-Texas Area

Screwworm Research
P. O. Box 986
Mission, TX 78572

10 de Enero, 1983

Dr. Pedro Reyes-Castillo
Presidente
Sociedad Mexicana de Entomología
Apartado Postal 7-1080
06700 México, D. F.

Estimado Dr. Reyes:

Me honra mucho con su amable invitación a presentar una conferencia inaugural en el XVIII Congreso Nacional de Entomología en Tapachula, Chis. Acepto este honor y prepararé un discurso, en parte, historico pero otra parte contemporáneo, que explicará el desarrollo de los metodos de control, los problemas que enfrentan el programa en México y los estudios entomológicos en progreso. Sugiero el título siguiente: La Erradicación del Gusano Barrenador de la República Mexicana y Los Estudios Entomológicos que Apoyan el Programa. Yo podría presentar este trabajo en 30 minutos.

Si usted y el Comité de Programa estan de acuerdo con las ideas anteriores, empezaré a preparar la conferencia. Agradezco mucho la oportunidad de platicar con los colegas mexicanos sobre nuestro programa binacional.

En conclusión mando mis saludos muy atentos a usted y la Mesa Directiva. Me alegra mucho saber que el Dr. Halffter ha subido a un puesto alto y muy importante a México y felicito este compañero tan capaz.

Sinceramente,

O. H. GRAHAM
Location/Project Leader



APARTADO POSTAL No. 7- 1080

México D.F. a 16 de Diciembre, 1982.

Dr. Oscar H. Graham
P.O. Box 986
Mission, Texas 78572
U.S.A

Muy estimado Dr. Graham:

Me dió mucho gusto el platicar con usted en Tuxtla Gutiérrez, Chis. La presente es para ratificar la invitación por parte de la Sociedad Mexicana de Entomología a que nos exponga una de las conferencias inaugurales en nuestro próximo XVIII Congreso Nacional de Entomología a celebrarse del 17 al 20 de Abril de 1983 en la ciudad de Tapachula, Chis. y que usted tan amablemente acepto en forma verbal.

Pienso que el tema de su exposición puede referirse al problema de la mosca barrenadora del ganado, exponiendo los avances obtenidos en su control, la colaboración establecida entre U.S.A y México, la tecnología utilizada y las bases científicas en que estos aspectos están fundamentados. De aceptar usted esta sugerencia, le ruego nos haga llegar el título de la conferencia, así como el manuscrito respectivo, que será publicado en Folia Entomológica Mexicana. Las conferencias inaugurales disponen de 30 a 45 minutos para su exposición indíquenos usted cual de estos tiempos prefiere.

Ruego a usted acepte mi agradecimiento y mis saludos cordiales.

M. en C. Pedro Reyes-Castillo
Presidente.

P.D.- El Dr. Gonzalo Halffter ha sido nombrado Director Adjunto de Desarrollo Científico del Consejo Nacional de Ciencia y Tecnología, le envia muchos saludos.



United States
Department of
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Southern Region
Oklahoma-Texas Area

Screwworm Research
P. O. Box 986
Mission, TX 78572

January 20, 1983

SUBJECT: Temporary Hire of a Category 3 Entomologist

TO: DR. J. R. JOHNSTON
Area Director
P. O. Box EC
College Station, TX 77841

Dr. R. L. Harris has helped us tremendously by going to Tuxtla as his time has permitted and testing new screwworm larval diets. He has had considerable help from Dr. R. D. Peterson and Biologist, Maria Elena Vasquez and as a group they have made noteworthy progress. At this point I remain confident that an improved diet can be developed which will both save money (the potential savings are in the millions) and improve the quality of the fly produced by the Tuxtla plant. However, the problems have not been as easy to solve as Bob and I first anticipated and I need to give the project added impetus.

At this time the project needs the fulltime services of someone with extensive experience in the mass-rearing of screwworms. Mr. Paul Nichols, who worked in the plant at Mission for almost 20 years before being RIF'd by APHIS, has applied and is immediately available. We have the funds to pay his salary and I request that Mr. Nichols be appointed as soon as possible as a Category 3 Entomologist, the grade to be determined by a Personnel Classifier. (He was a GS-12/5 at the time of his termination.) The proposed termination date for the temporary appointment would be September 30, 1983.

O. H. Graham

O. H. GRAHAM
Location/Project Leader

cc:

R. L. Harris
H. E. Brown
R. A. Bram



United States
Department of
Agriculture

Agricultural
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Southern Region
Oklahoma-Texas Area

Screwworm Research
P. O. Box 986
Mission, TX 78572

January 21, 1983

Dr. R. H. Wharton
CSIRO - Long Pocket Laboratories
Private Bag No. 3
P. O., Indooroopilly, Qld. 4068
Australia

Dear Harry:

It was indeed a pleasant surprise to receive your letter of January 11; I am delighted to read that you are now back in CSIRO. Yes, although long overdue for retirement, I am continuing with the Screwworm Research program, hopefully long enough to see the eradication program arrive at the Isthmus of Tehuantepec.

In reply to your question about screwworm attractants and trapping, I sometimes feel that rather than learning from our studies, we know less and less about the field as the years go by. Nevertheless, the eradication program uses large quantities of Swormlure, the synthetic attractant, and has at times benefited from the use of SWASS (an acronym for Screwworm Adult Suppression System, a Swormlure-bait-toxicant system). I am enclosing a few reprints that will lead you to other publications and will be happy to attempt to answer any questions you may have.

We presently are seeing things in southern Mexico that we do not understand but perhaps it would be safe to say that SWASS was quite effective on Curacao, in the southwestern U.S. and in many parts of northern Mexico, all areas characterized by relatively high temperatures, low humidity and appreciable air movement. In southern Mexico we have seen some apparent failures, mostly in areas of high humidity, moderate temperatures, and (sometimes) very little air movement. Attempts to enhance Swormlure have been only partially successful.

Swormlure is believed by some workers to mimic flowers while others believe that it attracts flies which are searching for feces. It seems to be more attractive to young, unmated females than to older females. We fully agree with your suggestion that our goal should be the development of an attractant that mimics, or even outperforms, an animal wound but we seem to be far from that goal at the moment.

Please do write again if I can help. With best personal regards, I am

Sincerely,

O. H. GRAHAM
Location/Project Leader

cc: R. A. Bram
C. J. Whitten

Enclosures

Long Pocket Laboratories
Meiers Rd, Indooroopilly, Qld

Private Bag No. 3, PO, Indooroopilly, Qld. 4068
Telephone (07) 377 0711 Telex 41615

D. O. H. Graham
Screw-worm Research Laboratory,
P.O. Box 986, Mission, Texas 78572,

11/1/83

Dear Hugh,

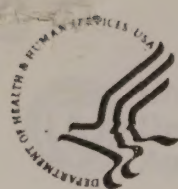
I gather that you are still busy with the screw-worm programme and send greetings for 1983. I am back at CSIRO after a period of $3\frac{1}{2}$ years in Indonesia on an Australian-Indonesian project to establish an animal husbandry research institute! The change was stimulating, but not good for my stability, or knowledge of livestock arthropods.

My reason for writing is to seek information on the trapping / attraction of screw-worm flies. I have a task to review non-chemical control of parasites of ruminants & have a general feeling that trapping, mainly for monitoring but possibly also for area control, may need a stimulus. I wonder what your views are on that & progress you have made in trapping / attractants etc.

Any comments, thoughts would be much appreciated. I suppose that the most critical thought is to be able to produce an attractant to a gravid fly that at least competes with a wounded calf. Are we anywhere near that?

Regards & best wishes
Harry Wharton

R. H. Wharton

National Institutes of Health
Bethesda, Maryland 20205

Mailing Address:

National Institutes of Health
Building 6, Room 137
Bethesda, Maryland 20205

January 21, 1983

Dr. O. H. Graham
USDA, ARS
Screwworm Research Project
P.O. Box 986
Mission, Texas 78572

Dear Dr. Graham:

I apologize for my belated reply to your letter of January 5th. I fully understand your problem since, on a much smaller scale of breeding, we encounter a similar lack of larval synchrony despite the fact that eggs are collected over an hour's laying period. Personally, I doubt whether this has anything to do with ecdysterone or hormone secretion as the larvae have plenty of food available even though they don't seem to utilize it at the same rate. About the only clue I have is that this lack of synchrony may have to do with the feeding and rate of growth of first instar larvae. We have observed that when our Calliphora larvae are raised under aseptic conditions on a semi-defined medium, several newly hatched individuals wander about for many hours during which time they appear to feed and grow very little if at all. At the same time other larvae appear to aggregate and collectively attack the diet at some particular location. These latter larvae are clearly larger, and ecdyse to the 2nd stage well ahead of the wandering ones. It would seem as though a "critical mass" of contiguous larvae are more efficient in digesting food than a solitary larva alone. This in turn may have to do with the fact that blowfly -- and I suspect, without knowing -- also screwworm larvae, feed by secreting digestive enzymes externally, and sucking up the digested products of proteolysis.

One further point, with which I am sure you are familiar, is that overcrowding the larvae results in a wider range of fully grown larval sizes, and a corresponding variation in adult fly weights, than when there is a lower larval density. Could this possibly be a factor in your rearing?

I regret that my comments are not more helpful, but the problem you raise is not one I am really competent to answer.

Yours very sincerely,

L. Levenbook
Laboratory of Physical Biology
National Institute of Arthritis,
Diabetes, and Digestive and Kidney
Diseases

LL:bjm



United States
Department of
Agriculture

Agricultural
Research
Service

Southern Region
Oklahoma-Texas Area

Screwworm Research
P. O. Box 986
Mission, TX 78572

January 5, 1983

Dr. L. Levenbook
Laboratory of Physical Biology
National Institutes of Health
Bethesda, MD 20205

Dear Dr. Levenbook:

I have read with great interest your paper with Dr. Shaaya on the feeding and pupariation of C. vicina larvae (J. Insect Physiol. 28: 683-688) and have speculated on the possible application of your findings to our research on the mass rearing of screwworm larvae. USDA, in cooperation with Mexican government agencies, operates a rearing plant at Tuxtla Gutierrez, Chiapas which routinely produces 300 to 500 million screwworm pupae per week. When newly colonized strains are first placed into mass production we often see a great deal of variation in the time that larvae spend in the rearing medium and the size of the crawl-off larvae. Many larvae leave the medium too soon and produce small flies of reduced vigor. Others do not crawl off of the rearing vats at the end of the normal rearing cycle (about 6 days) and are lost in the discarded medium.

Obviously program efficiency would benefit tremendously if larval nutrition and physiology could be deliberately manipulated so that all larvae attain a size of 60-75 mg at close to the same time (plus or minus 24 hr). Do you see any possibility that one or more of the subtle nutritional or hormonal factors which influence larval growth and puparium formation could be regulated so as to approach this ideal? We would greatly appreciate any comments you might care to make.

Sincerely,

O. H. GRAHAM
Location/Project Leader

cc:

R. A. Bram
H. E. Brown
R. L. Harris
R. D. Peterson
H. C. Hofmann
R. Lowe



United States
Department of
Agriculture

Agricultural
Research
Service

Southern Region
Oklahoma-Texas Area

Screwworm Research
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

January 24, 1983

SUBJECT: Remote Sensing Project for Screwworm Research

TO: O. H. Graham
Location/Project Leader

On 19 January I met with Ing. Martin Aluja, Technical Subcoordinator of Fruit Fly Research, and Ing. Jesus Alejandro, Chief of Remote Sensing at Tapachula to discuss the cost of a remote sensing project for the Screwworm Research Program.

The Remote Sensing Unit of the Moscamed Program has the equipment but lacks the funding to cooperate with us. Hence, they can provide the airplane and permit, pilot, camera, and crew if we can provide the money and film. Bill Hart can furnish the color infrared film and developing at \$700.00 per roll of approximately 200 photos. At 1:10,000 scale, 4 rolls would be necessary; one roll would suffice at 1:20,000. Including the cost of film, we estimated the cost of a remote sensing project as follows:

Scale of 1:20,000

$$\begin{aligned} &\$3.30 \text{ per km}^2 \times 1000 \text{ km}^2 \\ &= \$3,300.00 \end{aligned}$$

Scale of 1:10,000

$$\begin{aligned} &\$8.40 \text{ per km}^2 \times 1000 \text{ km}^2 \\ &= \$8,400.00 \end{aligned}$$

I examined photos of various scale and concluded that 1:10,000 is a maximum threshold for a research site, and that 1:5,000 or 1:2,500 would be necessary for detailed interpretation of selected "typical" regions within a proposed field site.

Hence, I recommend that we not invest this heavily in a remote sensing program at this time. The state of our technology (sugar identification, marking of seminal fluid, capturing females in animal-baited traps) is not such that we can guarantee an acceptable return for the investment.

However, I have alternative plans that I would like you to consider at this time. Ideally our field tests should be designed so that we can release 2 strains of externally and internally marked, unfed flies from ground release stations in areas which have been interpreted from stereo color infra-red photos of sufficient scale to analyze geographic features as well as plant and animal communities. Using WOTs and external markers, the movement and distribution of strains can be analyzed and compared. Using internal (seminal) markers and animal-baited traps, egg masses and females can be collected to determine % sterility and to compare competition between strains. Using all captured flies, nectar meals can be typed and their proportions compared to proportions of available carbohydrates in the field. Hence, this may provide us with clues to the location of resting and mating stations.

Attn: Board
Section 10102

Three techniques are currently being developed at Tuxtla. Harold Brown and I are attempting to characterize carbohydrate imbibition of flies and carbohydrate profiles of flowers and fruits. I am experimenting with 2 candidate chemicals for marking seminal fluid with fluorescent compounds. Finally, I am currently designing an animal baited trap to be tested within 2 weeks. With hard work and a great deal of good fortune, we may be ready for an all-encompassing field trial in 2 - 3 months.

However, we are under some pressure to conduct a second ground release test as soon as possible. We had discussed the possibility of using Pinotepa Nacional as a focal point for the test, but I can now foresee several disadvantages:

- 1) No acceptable topographic maps are available.
- 2) No aerial photos (in lieu of maps) are available.
- 3) Pupae can be shipped via air only through Oaxaca on Aereomexico, then transferred to a local airline and flown to Puerto Escondido.

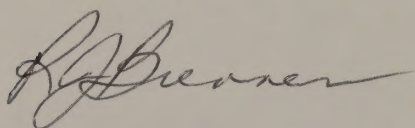
I suggest that we conduct this second test in virtually the same region of the Pacific Coastal Plain as the last test - from Tapachula to Acapetahua, Chiapas. There are several distinct advantages in this:

- 1) We are familiar with the area.
- 2) We have the cooperation of the campesinos and officials of the local cattlemen's association.
- 3) Pupae can be shipped daily on direct flights.
- 4) 1:50,000 topographic maps are available.
- 5) The Remote Sensing Unit of the Moscamed Program has over 3,000 color infrared aerial photos at 1:10,000 as well as several areas at 1:5,000 and 1:2,500.

The Moscamed Program has offered to loan us the photos. They are on file in Mexico City at La Comision Del Plan Nacional Hidraulico, S.A.R.H. We have the stereoscope and, hence, could interpret the area and begin preliminary trials involving the identification of carbohydrates, and movement of flies relative to geographic features at little to no additional cost.

Jesus Alejandro also mentioned that La Comision Del Plan Nacional Hidraulico should have most of Mexico photographed at 1:50,000 for cartography. It may be possible to obtain copies of photos for future field study locations in lieu of 1:50,000 topographic maps.

If you find these proposals acceptable, I would suggest that I go to Mexico City to examine and select the photos that will be needed to work near Tapachula, to select 1:50,000 maps of the Pacific Coastal Plain, and to make inquiries regarding 1:50,000 photos for future research.



R. J. BRENNER
Research Entomologist

cc: Ing. Martin Aluja
Ralph Bram
Harold Brown

cc: Bill Hart
Dave Hoffman
Chris Hofmann

